

Integrated Pest Magement of Hemlock Woolly Adelgid

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Maine Forest Service



Hemlock Woolly Adelgid (*Aldelges tsugae*)

- Hemlock
- ~1/8" discrete white woolly masses
- Undersides of twigs
- Base of needle
- Newer growth



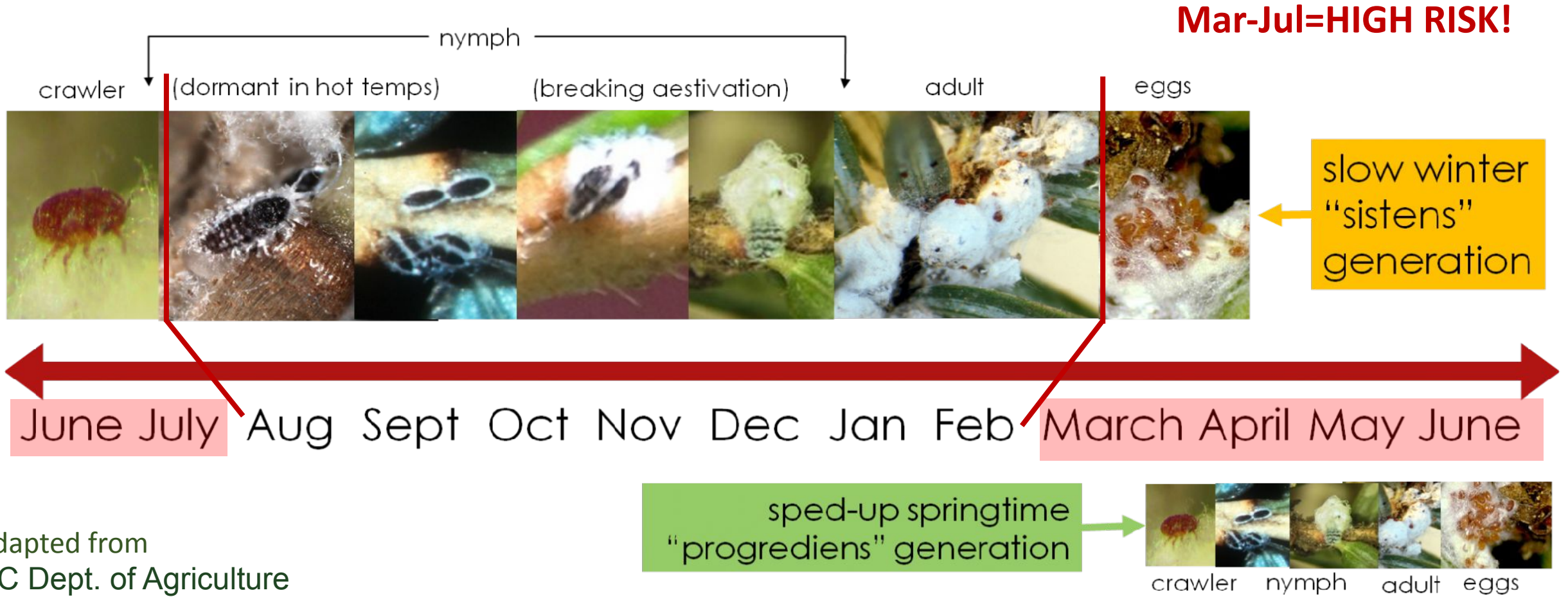
Photos: USFS



What is Integrated Pest Management?

- Integrated Pest Management (IPM) is a science-based decision-making process that combines tools and strategies to identify and manage pests... “a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks.”

Hemlock Woolly Adelgid (*Adelges tsugae*) Life Cycle



Adapted from
NC Dept. of Agriculture

Biological Control

- **Laricobius nigrinus** and **osakensis** (“Lari”)
 - Feed on winter generation
 - 1 generation/year
 - Cannot be bought
 - Released on public lands



Sasajiscymnus tsugae (St)

- Only predator that can be bought (up to \$3.50/beetle)
- 2 generations per year
- Feeds on both generations of HWA
- Has been recovered from most sites from Kittery to Woolwich
- Has not been recovered in neighboring states
- Suitable for woodlands, not urban/suburban areas
- Need a permit from ME-IFW

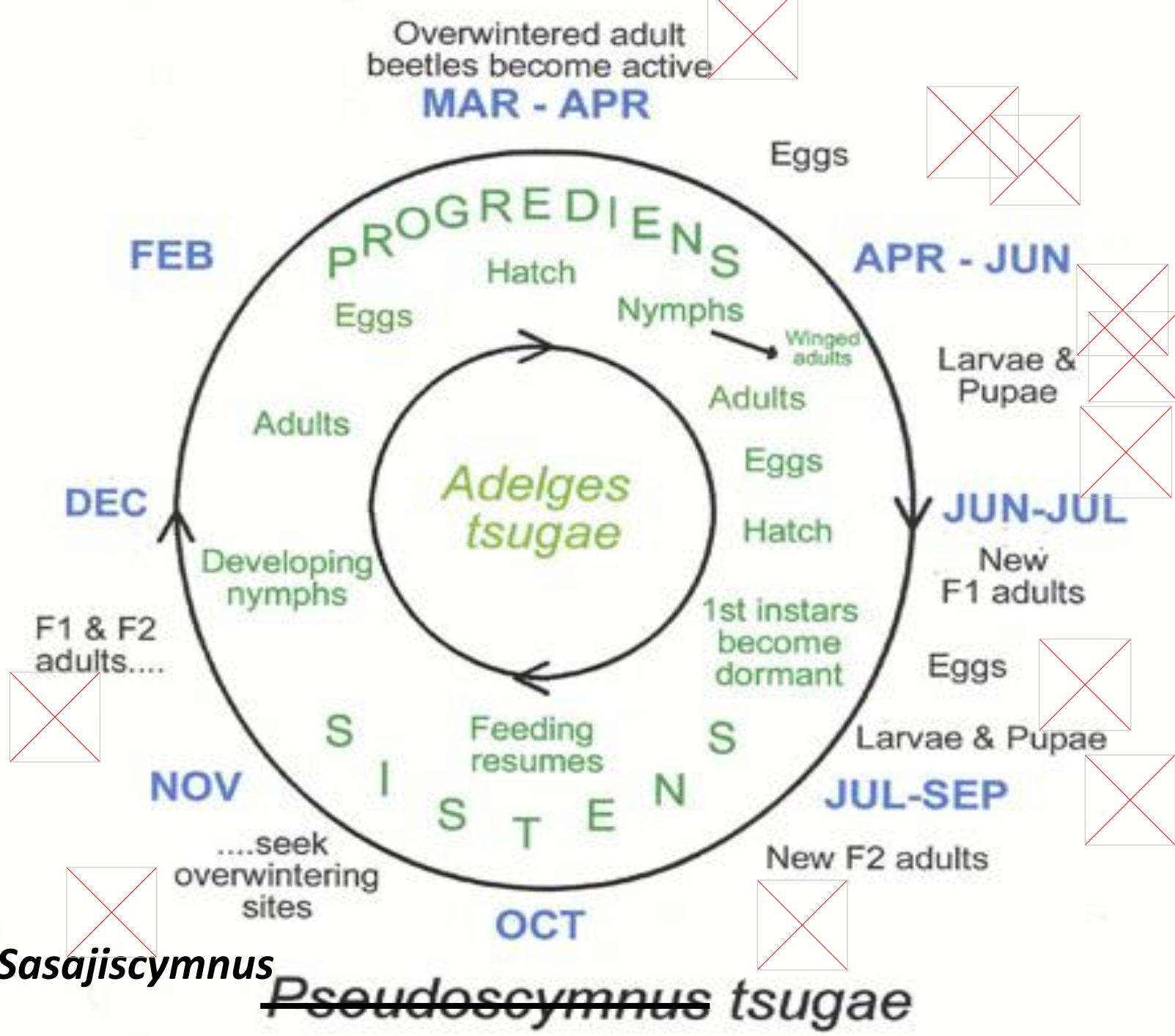
Sasajiscymnus tsugae



Sasajiscymnus tsugae



Photos: Joan Ray



The label is the law!

Pesticides

- Horticultural oil
 - Organic
 - Sprayed on foliage
 - Need complete coverage - good for small trees
 - Targets the crawlers
 - Often need to treat every year (or 2X/year)
 - Higher label rate in spring before budbreak, lower dose in summer
 - Do NOT use in fall (winter damage)





Photo:bioforest

Pesticides

- TreeAzin
 - Neem product, organic
 - Injected
 - One year of control
 - Expensive

Pesticides

- Neonicotinoids
 - Wide-spectrum (kill all insects feeding on that tree)
 - Systemic
 - Tree becomes a 'food desert'
 - Little environmental contamination
 - Limit to number of trees per acre you can treat
 - Trees can recover even if starting to decline

Exceptions for emerging invertebrate pests:

- Emerald ash borer
- Hemlock woolly adelgid
- Asian longhorned beetle

Board of Pesticides Control

Neonicotinoids - *dinotefuran*, *clothianidin*, *imidacloprid* & *thiamethoxam*

For sale only to licensed applicators by Restricted Use Pesticide Dealers

The BPC adopted a regulation to make certain neonicotinoids restricted use. This action was taken in response to legislation passed by the 130th legislature, [LD 155, Resolve, Directing the Board of Pesticides Control To Prohibit the Use of Certain Neonicotinoids for Outdoor Residential Use \(RESLV Chapter 33\)](#) to restrict homeowner and licensed applicator use of neonicotinoid pesticides that have been shown to decrease pollinator populations and productivity.

FEATURE

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CONT

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2731 or em
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for more inf



Photo:savehemlocksnc.org

Neonicitinoids

- Imidacloprid
 - Moves slowly through the tree (up to a year)
 - Long-lasting protection: 3-4 years (re-treat every 5-7 years)
 - Soil injection or drench, or basal bark treatment (maybe with penetrant)
 - Need to stop flowering plants

Neonitcinoids

- Dinotefuran

- More soluble, moves through tree faster (few weeks)
- good for basal bark spray, trunk injection
- Protection for 2+ years
- Can be used close to water



Photo:arborjet.com

INTEGRATING CHEMICAL AND BIOLOGICAL CONTROL OF THE HEMLOCK WOOLLY ADELGID:

A RESOURCE MANAGER'S GUIDE



ALBERT E. MAYFIELD III, SCOTT M. SALOM, KENTON SUMPTER,
TOM MCAVOY, NOEL F. SCHNEEBERGER, AND RUSTY RHEA

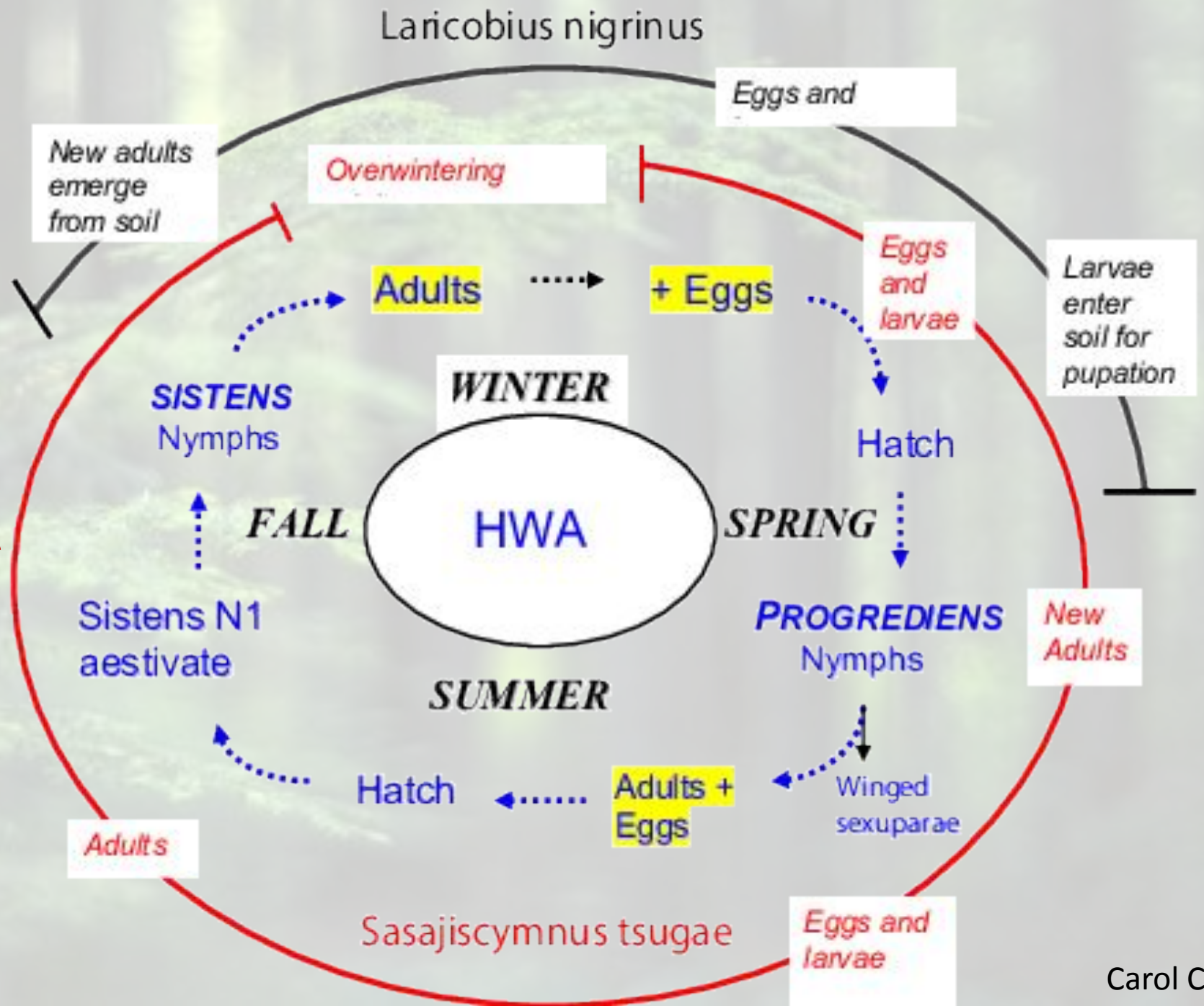
- They assume use of *Laricobius* and imidacloprid



When to treat/re-treat
in presence of biocontrol

Sasajiscymnus
(St)

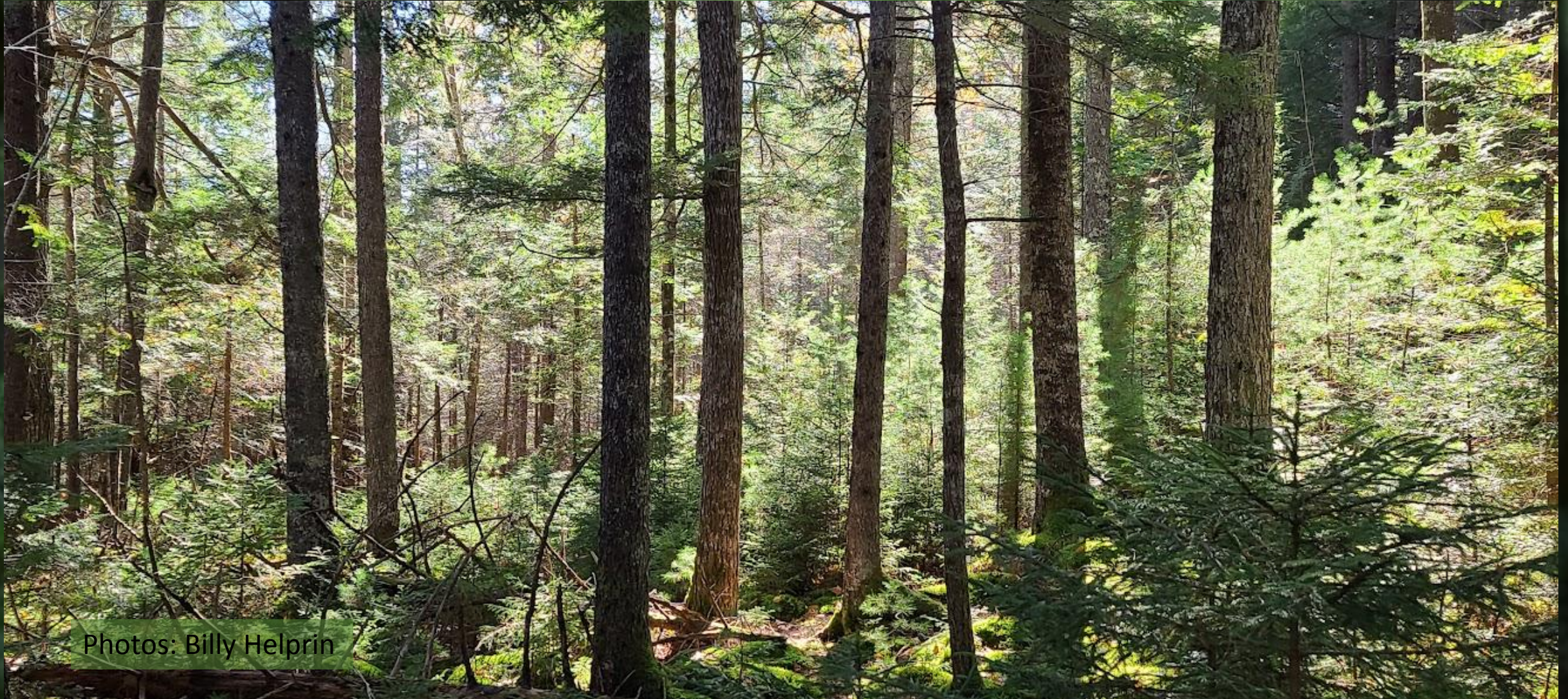
dinotefuran
(and
imidacloprid)



A photograph of a forest scene. In the foreground, there are several branches of evergreen trees with bright green needles, slightly out of focus. The background is filled with many tall, thin, vertical tree trunks, creating a sense of depth. The lighting is soft and dappled, with some brighter spots where sunlight hits the foliage. The overall color palette is dominated by various shades of green and dark brown.

Other things to consider...

Where are your best hemlock sites?



Photos: Billy Helprin

You can't save every hemlock

- Monitor
 - Where is HWA (early intervention)
 - Relative health of trees
- Where are the best conditions?
 - Good soil moisture/access to water
 - Sunlight – bad for HWA, good for trees
- Which trees have the highest value?
 - Ecologically
 - Human use/value

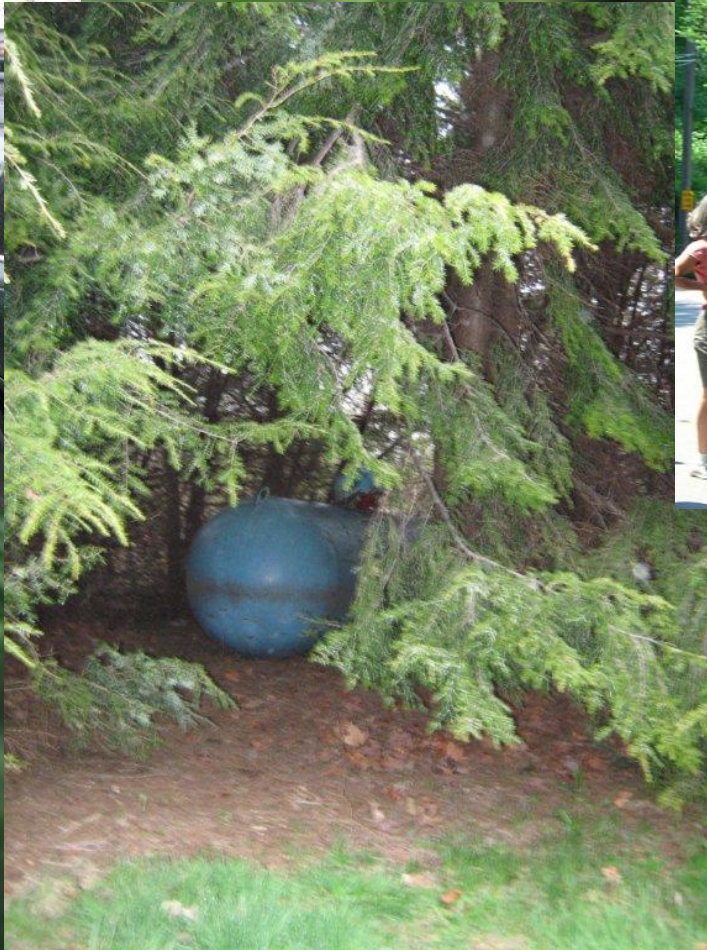
You can't save every hemlock

- Different strategies for different trees
 - Systemics for large trees, horticultural oil for small trees?
- Keeping track of trees
 - Permanent label/tag, GPS
 - Spreadsheet, map
 - Monitor!
- **Hemlock IPM will be a long-term game with no certain outcome**

Other Components of HWA IPM

- Cultural Control
 - Pruning of high risk trees

High-Risk Hemlocks



Now is a good
time to prune!

Other Components of HWA IPM

- Cultural Control
 - Pruning
 - Timing of major work – Aug-Feb

Other Components of HWA IPM

- Cultural Control

- Pruning
- Timing of major work – Aug-Feb
- Focus IPM on best sites – soil, water, sunlight, tree health, ecological value

In Summary

foresthealth@maine.gov

207- 287-2431

- High risk time for spread of HWA – **SPRING** (Mar-July)
- When predators are present include dinotefuran for quick movement through tree
- Include imidacloprid for long lasting protection
- When Lari is present, treat in the spring
- When St is present, treat in the late summer/early fall

A photograph of a forest stream flowing over rocks, surrounded by dense evergreen and deciduous trees. The water is white with foam as it flows over the rocks. The forest floor is covered with fallen leaves and branches.

•Questions?

•foresthealth@maine.gov

•(207) 287-2431